Inquiry Sequence for Unit Planning

UNIT NAME:	CREATED BY:	SUBJECT:	GRADE:
Classification of Life	Carissa Hale	Biology	10

Unit Rationale:

The study of how living things are classified is an important foundational topic for the remainder of the school year. Students will be learning specifics about each of the 6 kingdoms of life and some of the major phyla and classes. They need to understand how the system of classification was set up and why it is based on evolutionary relationships in order to understand how organisms fit into their groupings. Scientists are discovering thousands of new species each year, and they need to be able to classify them into existing taxonomic groups. Students will be exposed to a broad array of these organisms throughout the remaining weeks in the 4th quarter, and the classification unit will prepare them for understanding a little of the tremendous diversity of life.

This unit is structured with frontloading activities to engage students' background knowledge, followed by two lessons on classification vocabulary and the history of classification. The vocab and history lessons prepare students to learn how visual displays including dichotomous keys are used to classify and identify species. The lessons on dichotomous keys are structured for students to observe and analyze existing displays first and then design their own afterward. Students then read through a brief survey of the 6 kingdoms, to prepare them for a more in-depth study during the following weeks. Finally, students conduct a final project in which they research a real-life scenario where classification is necessary. They must each choose a species that was newly discovered and classified. Students will combine research skills and knowledge they gained during the unit to describe classification of the new species and where it fits within the six main taxonomic levels. I had originally hoped to have students include an actual dichotomous key for the new organism or a closely related species, but these are difficult to find for each species, so this piece of the report will be an optional extension for students who wish to challenge themselves.

Overarching themes that go beyond the classroom will include the value of having a unified system for various people who must work together and the necessity to have an organized system of arranging things.

[1] *Inquiring Minds Learn to Read and Write, Wilhelm,* Wilhelm, Boas. 2009. Adapted into this format by Cecilia Pattee BSWP TC 2012

Essential Question: When designing essential questions, think about… - Have I related the topic to students' past and present experiences? - Does the topic relate to human issues and human well-being? - How might I teach so that my students and I work together to build a community of practice? - Have I made good use of disciplinary concepts used by practitioners? How Might I explore the emotional, ethical, and human dimensions that relate to the topic?	**EQ:** Why is a classification system important to have? What's in a name? Why is unity valuable?

Naming Conceptual and Procedural Knowledge When identifying these skills, think about… - Do these skills mirror what experts do in their discipline?	**Procedural Knowledge (Idaho Core Standards)**	**Declarative Knowledge (Concepts I want students to understand)**
	6-12 CCSS Reading for Literacy in Science 1. Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text. 6-12 CCSS Reading for Literacy in Science 7. Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words. 6-12 CCSS Writing in Science 9. Draw evidence from literary or informational texts to support analysis, reflection, and research.	Biologists classify living organisms into groups as a method of organizing an abundance of information. Techniques of classification have changed over time; current classification is based on evolutionary relationships between organisms. Most scientists use a system of classification that places organisms into 3 overarching domains and 6 kingdoms within those domains.
Vocabulary When identifying these words, think about… Will these words be needed in multiple contexts?	**Academic Vocabulary** **Classification** **Methodical** **Nonspeculative** **Scheme** **Static**	**Content Vocabulary** **Taxonomy** **Binomial Nomenclature** **Taxon** **Domain** **Kingdom**

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		Phylum **Class** **Order** **Family** **Genus** **Species** **Division** **Archaea** **Protist** **Fungus**

Culminating activity

When designing a culminating project, think about…

- Where do I want the students to be at the end of the unit?
- Does the project allow students to demonstrate their conceptual and procedural understandings?
- Is it authentic by mirroring what "real experts" would do?
- Does it require intellectual quality?
- Does it consider differentiation? Are there different ways to complete the project?
- How does your culminating performance allow students to reach the mentioned standards?

*Attach Rubric or Assessment Guidelines

Project Description

Students will need to research a species that was discovered and classified within the past year. They will need to write a report that cites information multiple websites/articles to explain the following topics:

- A description of the new species
- A summary of ways to classify organisms and an explanation of how scientists classified this particular species
- A brief description of each of the taxonomic groups in which this species is included
- Explanation of how the terms taxonomy, binomial nomenclature, dichotomous key, and cladogram assist with classifying organisms

Measurable Objectives:

- The student will be able to (TSWBAT) read text from multiple online sources closely

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	• TSWBAT read a variety of print and graphic text in the form of dichotomous keys and cladograms to find information about a new species • TSWBAT cite information from multiple sources in the report • TSWBAT summarize information from each topic required for the report into brief paragraphs in essay form. • TSWBAT organize necessary information into four main paragraphs. • TSWBAT use correct mechanics when composing an essay
Frontloading When designing frontloading activities, think about… - How does your activity activate and build the students' prior knowledge or background information regarding your unit inquiry? - How does the activity work to motivate students for reading and inquiry regarding the theme? - How will the frontloading activity work to organize inquiry, set purposes, and consolidate learning about the theme throughout the unit, i.e., how will it help students set purposes for their reading, focus their learning, clarify what they are coming to know, and help them to monitor their learning progress?	FRONTLOADING STRATEGIES: "What does your name say about you?" class discussion: pose this question to the class and give them 2 minutes to discuss in small groups. Ask for each group to report back to the class the information that can be learned from a personal name. Compare this to binomial nomenclature: we can know about organisms that are related by reading their two-part Latin name. Classification of Music: play a few short clips of music and ask students to select the genre of music. Students discuss in small groups what that genre is based on. Discussion questions: what if we classified music based on the length of the song or the time of year it was written? Does our classification based on rhythm, tempo etc add meaning to the system? Beginning classification activity: small group s of students organize pictures of animals into groups based on their similarities. Each group then writes their method of organization. Groups then trade sets of animals and organization methods and try to follow the other group's method. Class discussion about the confusion of having multiple methods of sorting objects and the value of using one unified classification system.

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Sequencing Scaffolding Activities

When designing a scaffolding activity, think about …

- Does it allow students to explore the big ideas connected or relevant to the essential topic?
- Does it allow students to practice techniques required for disciplinary expertise in a variety of ways?
- Does it assist students to expand their conceptual and strategic repertoire?
- Does it provide for multiple entrance levels?
- Does it provide for multimodal learning?
- Does it provide for differentiation?
- Does it provide for student discovery and meaning making in a social setting?

Principles of Scaffolding

○ Close to home→ Far From Home ○ Current Knowledge→ Need to Know ○ Visual→ Written ○ Short→ Long	○ Easy→ Hard ○ Concrete→ Abstract ○ Directly Stated→ Implied ○ Supported→ Independent	○ Whole→ Part→ Whole ○ Learning→ Doing→ Reflecting ○ Model→ Mentor→ Monitor

Formative Assessments

When planning formative assessments within a unit think about…

- What is the intent of the unit? What is the purpose of this activity?
- How will the students be showing me what they know?
- What will I be monitoring or looking for in the students' thinking?
- How will I track the assessment of my students?
- How will the students leave this activity thinking about something in a new way or changed in some way?
- How is this activity layered for all students' learning?
- How does this activity allow students to practice more than one thing at a time?
- How will students be demonstrating true understanding – the capacity to flexibly use, extend, transfer, and think about what has been learned?

Week 1:

Activity/Strategy	Texts & Resources	Scaffolding Options	Idaho Core Standards Connection (Content Standards if applicable)	FORMATIVE ASSESSMENT Y/N

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Monday: Frontloading: "What's in a Name?" Class Discussion Classification of Music Group classification of animals according to similarities they choose	Pictures of various animals, grouped into sets of 20. One set of 20 per group of 3 students. Students keep track of their method of organization by writing distinguishing characteristics on paper (as in: animals with fur, animals with wings, etc)	Students are beginning with close to home concepts: thinking about personal names and how music is classified. They are challenged to think of connections between the organizational system for music and the need for meaning in the way that living organisms are organized. Students move to classifying animals according to characteristics they can visually identify, and they will hopefully discover the need to have one organizational system rather than many.	9-10.B.1.1.1 Explain the scientific meaning of system, order, and organization.	No formative assessment since this day is all for frontloading.
Tuesday: Vocab preview History of classification reading	Article about the history of classification and modern classification: http://anthro.palomar.edu/animal/animal_1.htm	Vocab previewing: students try to put the taxonomy levels in correct order using background knowledge about the terms "kingdom" "class" "family" "species" etc. Read through text once, highlighting main idea of each paragraph, circling the vocab terms that were previewed, and writing questions/comments in margins.	6-12 CCSS Reading for Literacy in Science 1. Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.	Y Students will turn in their highlighted/marked up articles before leaving. I will check for student progress and note the questions they have after the first reading.
Wednesday: Vocab review	http://anthro.palomar.edu/animal/animal_1.htm Text dependent question handout.	Partners review vocab terms from yesterday: they must each say each word aloud, along with an example of the	6-12 CCSS Reading for Literacy in Science 1. Read closely to determine what the text says explicitly and	Y Students will turn in their responses to the text-dependent

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History of classification reading		term or the definition. Read through text again, answering text-dependent questions.	to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.	questions. . I will grade for correctness.
Thursday: History of classification review Dichotomous key lab: identify leaves using dichotomous keys	Student responses to text-dependent questions from yesterday. Dichotomous key of 7 leaves with images to identify them.	Return students text-dependent questions and go over correct answers to correct misconceptions before going on to dichotomous key lab. Begin dichotomous key lab with whole group activity on board to analyze simple dichotomous keys. Move to partners using longer dichotomous keys to identify organisms.	6-12 CCSS Reading for Literacy in Science 7. Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words. 9-10.B.1.8.1 Analyze technical writing, graphs, charts, and diagrams.	Y Students will turn in the names of the 7 leaves they identified using the dichotomous key. I will check to make sure students were following the key correctly.
Friday: Dichotomous key lab: construct a dichotomous key	Images of several lizards to project on the board.	Students observe several types of lizards on the board and write 3 observations of each lizard. Using the student observations, we as a class construct a dichotomous key to sort the lizards.	6-12 CCSS Reading for Literacy in Science 7. Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.	N Formative assessment after partners construct keys on Monday.
Week 2:				

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Activity/Strategy	**Texts & Resources**	**Scaffolding Options**	**Idaho Core Standards Connection (Content Standards if applicable)**	**FORMATIVE ASSESSMENT Y/N**
Monday: Dichotomous Key Lab	Images of several snakes to pass out to student pairs.	Students work in partners to construct their own dichotomous key with a new set of images of several species of snakes.	6-12 CCSS Reading for Literacy in Science 7. Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.	Y Students will turn in their dichotomous keys and I will grade for correct form.
Tuesday: 6 Kingdoms reading	Images of organisms in the 6 kingdoms to project on the board. Handout: graphic organizer note catcher.	Begin with viewing images of organisms in the 6 kingdoms and observing differences. Students then fill out graphic organizer note catcher as they read about the 6 kingdoms.	6-12 CCSS Reading for Literacy in Science 1. Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.	Y Exit Slip: 3-2-1 strategy about the 6 kingdoms
Wednesday: 6 kingdoms reading	Handout with brief descriptions and/or images of organisms from each kingdom.	After completing the reading and graphic organizer, students work in pairs to identify the kingdom when given a brief description of an organism or an image.	6-12 CCSS Reading for Literacy in Science 1. Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the	Y Graphic Organizers will be formative assessment. Partner work on identifying the kingdom that individual organisms belong to.

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			text.	
Thursday: Final Project	Student-researched articles	I model to students how to research the information they need. Students write a personal goal for the work to complete on day 1 and the work to complete on day 2.	6-12 CCSS Reading for Literacy in Science 7. Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words. 6-12 CCSS Writing in Science 9. Draw evidence from literary or informational texts to support analysis, reflection, and research. 6-12 CCSS Writing in Science 10. Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences. 6-12 CCSS Reading for Literacy in Science 9. Analyze how two or more texts address similar themes or topics in order to build knowledge or to compare the approaches	At the end of the period, students complete a progress report indicating what work they have completed and work is left to do.

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			the authors take.	
Friday: Final Project	Student-researched articles	Students review their progress reports from Friday to remind themselves what they need to complete today.	6-12 CCSS Writing in Science 9. Draw evidence from literary or informational texts to support analysis, reflection, and research. 6-12 CCSS Writing in Science 10. Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences. 6-12 CCSS Reading for Literacy in Science 9. Analyze how two or more texts address similar themes or topics in order to build knowledge or to compare the approaches the authors take.	Students complete another progress report indicating if any work needs to be completed as homework over the weekend.

Week 3:

Activity/Strategy	**Texts & Resources**	**Scaffolding Options**	**Idaho Core Standards Connection (Content Standards if applicable)**	**FORMATIVE ASSESSMENT Y/N**

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Monday: Students share their reports in small groups. They show an image of the new species to their group and explain how it was classified. They share basic facts about the taxonomic levels that the species belongs in.	Student essays and photographs of the species they researched.	I will model to the class what to share in their report to their small group. Students share their reports in small groups.	9-10 CCSS ELA Speaking and Listening. Come to discussions prepared, having read and researched material under study; explicitly draw on that preparation by referring to evidence from texts and other research on the topic or issue to stimulate a thoughtful, well-reasoned exchange of ideas.	Summative assessment

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Universal Design for Learning Components

Provide Multiple Means of Representation.

1.3 Offer alternatives for visual information: the "Biological Classification Text" is available online with hyperlinks to definitions, verbal definitions, and pronunciations of terms.

2.1 Clarify vocabulary and symbols: vocab previewing assignment

2.2 Support decoding of text, mathematical notation, and symbols: Close reading strategy with highlighting and marking-up text

3.1 Activate or supply background knowledge: frontloading activities with "what's in a name?" classification of music, and group classification of images of animals

3.3 Guide information processing, visualization, and manipulation: note catcher handout, text-dependent questions

Provide Multiple Means of Expression

4.2 Optimize access to tools and assistive technologies: Students with reading disabilities may have the "Biological Classification of Text" read aloud to them online and may access the helpful links online

5.2 Build fluencies with graduated levels of support for practice and performance: the dichotomous key lab and the cladogram assignment are very scaffolded, with the teacher modeling, then pairs following guidelines, and then individuals completing the work on their own.

6.1 Guide appropriate goal setting: I will model for students how to set manageable goals for completing their final report and I will require students to set goals for each work day and reflect on their progress at the end of each work day.

6.2 Support planning and strategy development: I will model for students how to plan out their work days to get their work done efficiently for their final project.

Provide Multiple Means of Engagement

7.2 Optimize relevance, value, and authenticity: frontloading activities relate classification of life to music, a topic most teens are interested in. The final project allows students to choose a newly discovered species that interests them.

9.3 Develop self-assessment and reflection: students will reflect on their progress as they are completing the final essay. They will also reflect on material learned at the end of the unit.

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Accommodations for ESOL and Special Ed students

- Students with reading disabilities or ESOL students may have the "Biological Classification of Text" read aloud to them online and may access the helpful links online.
- Students will be working in partners for many scaffolded activities.
- ESOL students and Special Ed students may have extra time to complete the text-dependent questions, the individually constructed cladogram, and the written essay as long as the extra time is requested from the teacher and an alternate due date set.
- ESOL students and Special Ed students will receive a physical copy of the "6 kingdoms reading" from the textbook so they may highlight and mark up the text to assist them as they read it.
- One special needs student in my class who struggles with long writing assignments may put together a powerpoint as an alternate option for the final report. Mechanics of writing will not be held against him. He can find images and videos of the vocab terms and the 6 taxonomic groups to support his written explanation of these topics.

Extensions for advanced students

- An extension for the final project will be to find a dichotomous key and/or cladogram for a closely related species or genus to the newly discovered species, and explain what kind of information is available about the organisms with this kind of display.

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Rubric Scoring Guide for Classification Final Essay

27-30 pts = A 24-26 pts =B 21-23 pts = C 18-20 pts = D 17 and below= F

	Advanced 6 pts	Proficient 5 pts	Basic 4 pts	Needs Work 1-3 pts
Summary of new species	Student lists several characteristics of the new species and includes a photograph.	Student lists a few characteristics of the new species and includes a photograph.	Student lists only 1-2 characteristics of the new species and includes a photograph.	Student does not describe the new species or does not include a photograph.
Explanation of how scientists classified this species	Student describes multiple ways to classify a species and identifies the specific method used to identify this one.	Student describes 2 ways to classify a species and identifies the specific method used to identify this one.	Student describes only the method of classification used to identify the species in the article.	Student describes what makes this species unique without mentioning specifics of classification.
Description of the taxonomic groupings of the new species.	Student explains 2-3 characteristics of the genus, family, order, class, phylum, and kingdom that the new species belongs in.	Student explains 2-3 characteristics of 5 taxonomic groups.	Student explains 2-3 characteristics of 4 taxonomic groups.	Student explains 2-3 characteristics of 1-3 taxonomic groups.
Mechanics: grammar, spelling, punctuation	Essay is arranged into 4 paragraphs. There are no mechanical errors.	Essay is arranged in 4 paragraphs. There are a few mechanical errors.	Essay is arranged in 2-3 paragraphs, OR more than 4 paragraphs. There are several mechanical errors.	There is no paragraph structure. There are numerous mechanical errors.
Citations	Student correctly formats all citations in APA style. All sources used are reliable, scientific sources	Student formats all citations in APA style with few errors. All sources used are reliable and scientific.	Student formats citations in APA style with multiple errors per citation or includes websites that are not written by credentialed authors.	Student includes a list of links but no formatting of citations, or includes websites such as Wikipedia, ask.com, answers.com

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Biological Classification of Life Text

Introduction

In this tutorial you will be learning about the **Linnaean system of classification** used in the biological sciences to describe and categorize all living things. The focus is on finding out how humans fit within this system. In addition, you will discover part of the great diversity of life forms and come to understand why some animals are considered to be close to us in their evolutionary history.

How many species are there?

This is not an easy question to answer. About 1.8 million have been given scientific names. Thousands more are added to the list every year. Over the last half century, scientific estimates of the total number of living species have ranged from 3 to 100 million. The most recent methodical survey indicates that it is likely to be close to 9million, with 6.5 million of them living on the land and 2.2 million in the oceans. Tropical forests and deep ocean areas very likely hold the highest number of still unknown species. However, we may never know how many there are because it is probable that most will become extinct before being discovered and described.

The tremendous diversity in life today is not new to our planet. The noted paleontologist Stephen Jay Gould estimated that 99% of all plant and animal species that have existed have already become extinct with most leaving no fossils. It is also humbling to realize that humans and other large animals are freakishly rare life forms, given that 99% of all known animal species are smaller than bumble bees.

Why should we be interested in learning about the diversity of life?

In order to fully understand our own biological evolution, we need to be aware that humans are animals and that we have close relatives in the animal kingdom. Grasping the comparative evolutionary distances between different species is important to this understanding. In addition, it is interesting to learn about other kinds of creatures.

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When did scientists begin classifying living things?

Before the advent of modern, genetically based evolutionary studies, European and American biology consisted primarily of **taxonomy** or classification of organisms into different categories based on their physical characteristics and presumed natural relationship. The leading naturalists of the 18th and 19th centuries spent their lives identifying and naming newly discovered plants and animals. However, few of them asked what accounted for the patterns of similarities and differences between the organisms. This basically nonspeculative approach is not surprising since most naturalists two centuries ago held the view that plants and animals (including humans) had been created in their present form and that they have remained unchanged. As a result, it made no sense to ask how organisms have evolved through time. Similarly, it was inconceivable that two animals or plants may have had a common ancestor or that extinct species may have been ancestors of modern ones.

One of the most important 18th century naturalists was a Swedish botanist and medical doctor named Karl von Linné. He wrote 180 books mainly describing plant species in extreme detail. Since his published writings were mostly in Latin, he is known to the scientific world today as **Carolus Linnaeus**, which is the Latinized form he chose for his name.

Carolus Linnaeus
1707-1778

In 1735, Linnaeus published an influential book entitled *Systema Naturae* in which he outlined his scheme for classifying all known and yet to be discovered organisms according to the greater or lesser extent of their similarities. This Linnaean system of classification was widely accepted by the early 19th century and is still the basic framework for all taxonomy in the biological sciences today.

The Linnaean system uses two Latin name categories, **genus** and **species,** to designate each type of organism. A genus is a higher level category that includes one or more species under it. Such a dual level designation is referred to as a binomial nomenclature or **binomen** (literally "two names" in Latin). For example, Linnaeus described modern humans in his system with the binomen ***Homo sapiens***, or "man who is wise". *Homo* is our genus and *sapiens* is our species.

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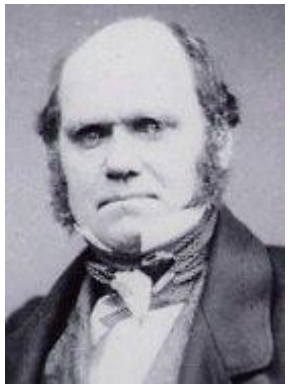
genus		genus	
species	species	species	species

Linnaeus also created higher, more inclusive classification categories. For instance, he placed all monkeys and apes along with humans into the order ***Primates***. His use of the word Primates (from the Latin *primus* meaning "first") reflects the human centered world view of Western science during the 18th century. It implied that humans were "created" first. However, it also indicated that people are animals.

order							
family				family			
genus		genus		genus		genus	
species	species	species	species	species	species	species	species



Charles Darwin
1809-1882

While the form of the Linnaean classification system remains substantially the same, the reasoning behind it has undergone considerable change. For Linnaeus and his contemporaries, taxonomy served to rationally demonstrate the unchanging order inherent in Biblical creation and was an end in itself. From this perspective, spending a life dedicated to precisely describing and naming organisms was a religious act because it was revealing the great complexity of life created by God.

This static view of nature was overturned in science by the middle of the 19th century by a small number of radical naturalists, most notably **Charles Darwin**. He provided conclusive evidence that evolution of life forms has occurred. In addition, he proposed natural selection as the mechanism responsible for these changes.

Late in his life, Linnaeus also began to have some doubts about species being unchanging. Crossbreeding resulting in new varieties of plants suggested to him that life forms could change somewhat. However, he stopped short of accepting the evolution of one species into another.

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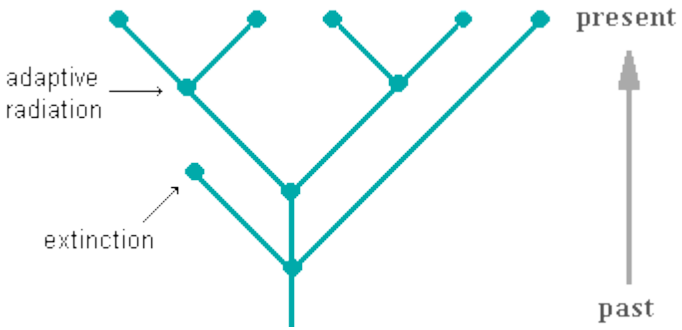
Why do we classify living things today?

Since Darwin's time, biological classification has come to be understood as reflecting evolutionary distances and relationships between organisms. The creatures of our time have had common ancestors in the past. In a very real sense, they are members of the same family tree.

The great diversity of life is largely a result of branching evolution or **adaptive radiation**. This is the diversification of a species into different lines as they adapt to new ecological niches and ultimately evolve into distinct species. Natural selection is the principal mechanism driving adaptive radiation.



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Rationale for appropriate complexity of text:

According to the CCST, students should be reading texts at the upper end of the 1100-1310 range by the end of their sophomore year. This text has a Lexile level of 1250, so it is in the appropriate Lexile band. The text is 3 ½ pages long, so the majority of students will struggle with reading it all in one class period. It contains many new vocab terms and concepts that they need to understand, but we will do a vocab frontloading activity and use 2 class periods to closely read the article and write about the concepts it contains. This text has a brief introductory paragraph, followed by 4 headings in the form of questions. Each question is followed by 1-8 paragraphs of text that respond to the question. Interspersed with the text are two images of scientists, two tables and one graphic that demonstrate examples of a few concepts. The organizational structure and graphics will assist students in understanding the information.

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Text-Dependent Questions

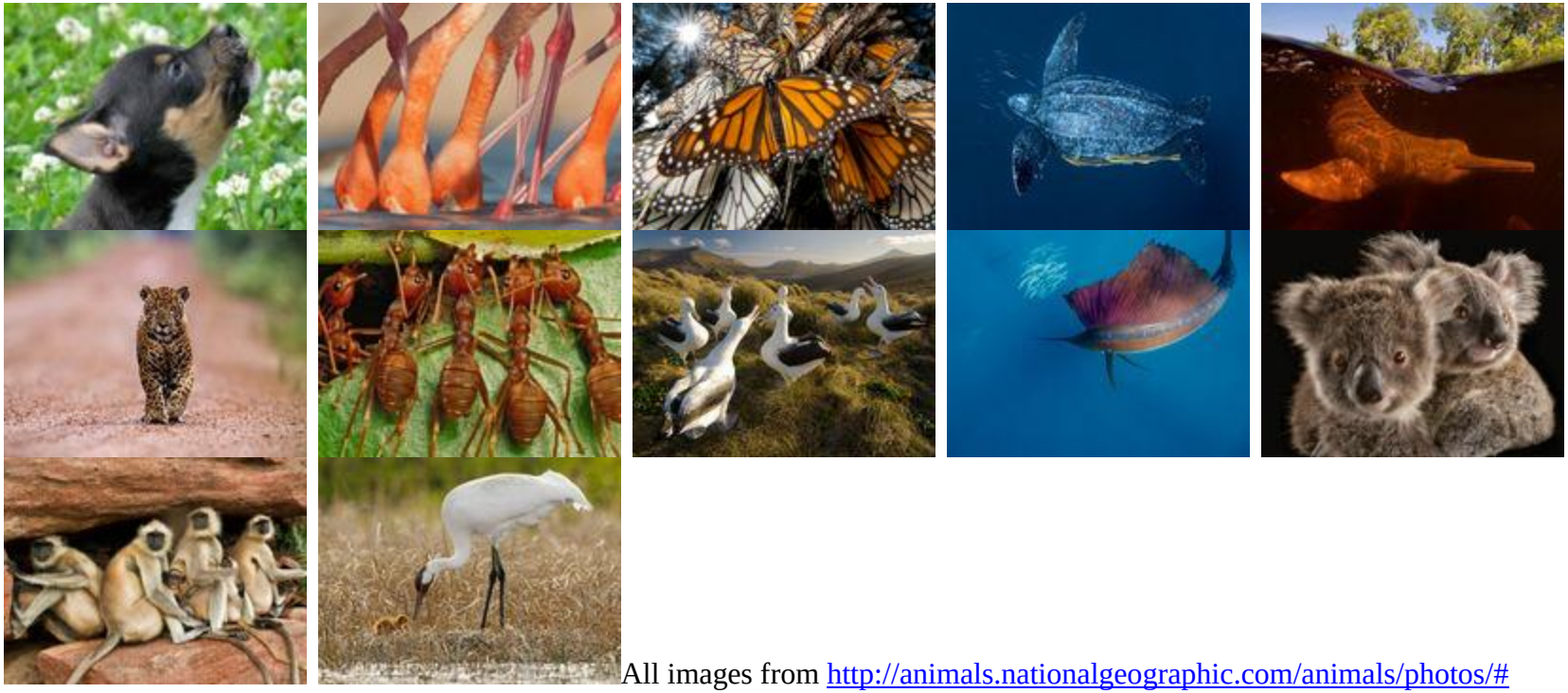
1. The first question, “How many species are there?” is followed by an opening statement of “This is not an easy question to answer.” Paraphrase why it is not easy to answer the question.
2. Based on the context, what is the difference between scientific estimates and methodical surveys?
3. Why do you think the author states “In order to fully understand our own biological evolution, we need to be aware that humans are animals” ? Do you agree with this statement? Why/why not?
4. Define taxonomy in your own words.
5. How was the approach used by naturalists in the 18th and 19th centuries “nonspeculative?”
6. The three terms, genus, species, and binomial nomenclature, are interrelated. Explain how their definitions are connected.
7. Paraphrase how the classification of humans into the order, Primates, reflects the worldview of 18th century scientists.
8. How do you think the statistics in paragraph 3 relate to the human-centered view discussed in paragraph 9?
9. Paraphrase the information from Table 2 into words to describe the relationship between genus, species, order, and family.
10. The word, static, has multiple meanings. What is the meaning in the context of paragraphs 10 and 11?
11. The author uses the term “radical” in paragraph 11 to describe the work of Charles Darwin. How is this term appropriate based on the context of paragraphs 9 and 10?
12. Paraphrase the relationship between the terms, evolution, adaptive radiation, natural selection, and classification.
13. Infer how culture and religion influenced the methods used to classify living things.
14. List the contributions to the study of classification by Charles Linnaues and Charles Darwin. Include their time periods and worldviews.

[1] *Inquiring Minds Learn to Read and Write, Wilhelm,* Wilhelm, Boas. 2009. Adapted into this format by Cecilia Pattee BSWP TC 2012

15. The author speaks of naturalists repeatedly throughout the text. What do you think are some activities a naturalist would do? How do you think the job description of naturalist has changed since the 18th century?
16. What do you think the author's purpose was in writing about worldviews of various scientists?

Images of Animals for Frontloading Classification Activity

[1] *Inquiring Minds Learn to Read and Write, Wilhelm,* Wilhelm, Boas. 2009. Adapted into this format by Cecilia Pattee BSWP TC 2012



All images from http://animals.nationalgeographic.com/animals/photos/#

[1] *Inquiring Minds Learn to Read and Write, Wilhelm,* Wilhelm, Boas. 2009. Adapted into this format by Cecilia Pattee BSWP TC 2012

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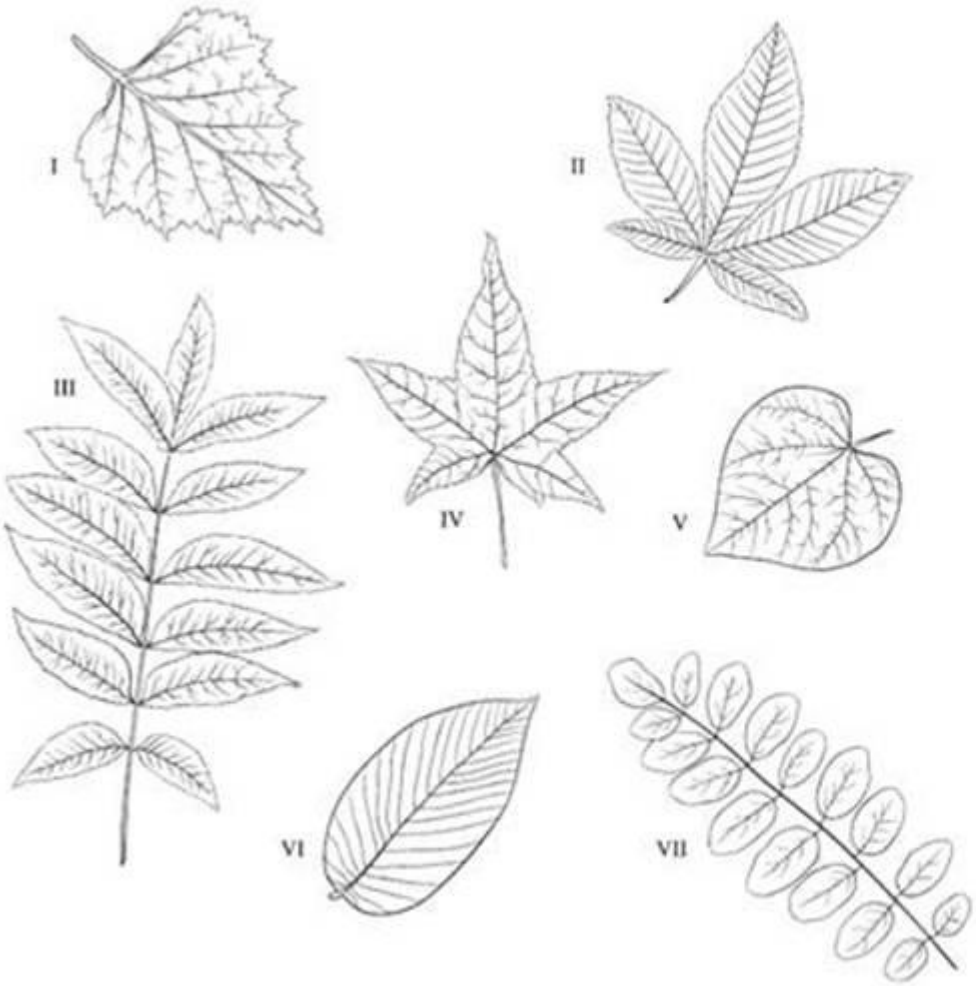

http://www.quia.com/pop/324544.html

[1] *Inquiring Minds Learn to Read and Write, Wilhelm,* Wilhelm, Boas. 2009. Adapted into this format by Cecilia Pattee BSWP TC 2012

Elgaria coerulea (Northern Alligator Lizard)	*Crotaphytus bicinctores* (Mojave Black - collared Lizard)	*Gambelia wislizenii* (Longnose Leopard Lizard)
		
Phrynosoma douglassii (Short-horned Lizard)	*Phrynosoma platyrhinos* (Desert Horned Lizard)	*Sceloporus graciosus* (Sagebrush Lizard)
		
Sceloporus occidentalis (Western Fence Lizard)	*Uta stansburiana* (Side-blotched Lizard)	*Cnemidophorus tigris* (Western Whiptail)
		

Lizards of Idaho (for building a dichotomous key)

Taken from:
http://imnh.isu.edu/digitalatlas/bio/reptile/main/lacerid.htm

Snakes of Idaho (for student pairs to construct a dichotomous key)

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Charina bottae (Rubber Boa)

Coluber constrictor (Racer)

Diadophis punctatus (Ringneck Snake)

Hypsiglena torquata (Night Snake)

Masticophis taeniatus (Striped Whipsnake)

Pituophis catenifer (Gopher Snake)

Rhinocheilus lecontei (Longnose Snake)

Sonora semiannulata (Ground Snake)

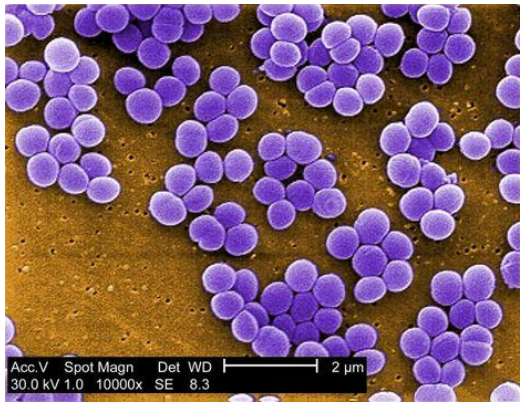
Thamnophis elegans (Western Terrestrial Garter Snake)

Thamnophis sirtalis (Common Garter Snake)

Crotalus viridis (Western Rattlesnake)

Taken from: http://imnh.isu.edu/digitalatlas/bio/reptile/main/serpid.htm
Images of 6 Kingdoms to Project on the Board for Intro to 6 Kingdoms Reading

[1] *Inquiring Minds Learn to Read and Write, Wilhelm,* Wilhelm, Boas. 2009. Adapted into this format by Cecilia Pattee BSWP TC 2012



elm, Boas

Cecilia Pattee BSWP TC 2012

Name: _____ Period: _____

6 Kingdoms Graphic Organizer

	Bacteria	Archaea	Protists	Fungi	Plants	Animals
What type of cells do they have?						
How do they obtain nutrition?						
Do they have complex organ systems?						
Unicellular or Multicellular?						
Sketch of organism						
2 other facts about this kingdom						

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Names: _____

Identify the Kingdom

1. This organism, the Euglena, is composed of a single cell with one nucleus. The Euglena has some plant-like characteristics and some animal-like characteristics. It can perform photosynthesis but it can also consume microorganisms.
   Kingdom: _____

2. The Methanocaldococcus jannaschii is a species that lives in hydrothermal vents, at a depth in the ocean floor where the pressure would crush a submarine. This species survives using carbon dioxide, hydrogen, and a few salts.
   Kingdom: _____

3. The Vampyrum spectrum is an organism that is carnivorous. It has a complex organ system but no cell walls.
   Kingdom: _____

4. The Gomphus clavatus is a species that is named after a pig's ear. It obtains nutrients by secreting digestive enzymes onto a food source and then absorbing digested materials into cells.
   Kingdom: _____

5. Antirrhinum is a genus of organisms that resemble a dragon's mouth. The organisms are multicellular with cell walls and are organized into complex body systems. It obtains food through photosynthesis.
   Kingdom: _____

6. Steptococci are organisms that live in chains or pairs. They have cell walls containing peptidoglycan.
   Kingdom: _____

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Sample Final Essay

Carissa Hale

General Biology

Classification Final Essay

The olinguito is a new mammal discovered in South America. It is the size of a raccoon and has a face like a teddy bear. The olinguito eats fruit, and most weigh about 2 pounds. They have dark, bushy fur. They live in the forests of Ecuador and Columbia.

Scientists originally thought this species was the same as the olingo. They classified it as its own species because it is smaller than an olingo, it has a shorter tail, its face is rounder, and its ears are smaller. Scientists tried to breed an olinguito with several olingos but it could not breed with them because it was not the same species.

The olinguito is in the kingdom Animalia. This kingdom is multi-cellular, heterotrophic, and lacks cell walls. It is in the phylum chordate, which means that at some point in its development it has a notochord, dorsal nerve chord, endostyle, and post-anal tail. It is in the class mammalian, which means it has hair, 3 middle ear bones, and mammary glands. The order is carnivore. Carnivores eat flesh of other animals, but they can also eat plants. The family is the raccoon family: Procyonidae. This family is only found in the Americas and they are all small species with tails, light and dark contrasting fur, and claws. The genus is Bassaricyon, which includes nocturnal species that live in the forest.

A dichotomous key is used to identify an unknown organism found in the wild by selecting between 2 choices for a variety of features about the species until it is narrowed down to the name of the organism. A cladogram is a diagram with branches, like a tree, that depicts the evolutionary relationships of organisms. Taxonomy is the science of classifying organisms into groups. Binomial nomenclature is the two-name system that includes a genus name and a species name in Latin for each organism.

[1] *Inquiring Minds Learn to Read and Write, Wilhelm,* Wilhelm, Boas. 2009. Adapted into this format by Cecilia Pattee BSWP TC 2012

Sources:

Fox News. (2013, August 15). New mammal species discovered: A raccoon-sized critter with teddy bear looks. Retrieved February 10, 2015, from http://www.foxnews.com/science/2013/08/15/new-mammal-species-discovered-with-teddy-bear-looks/

Meyers, P. (2000, May 31). Procyonidae (coatis, raccoons, and relatives). Retrieved December 10, 2013, from http://animaldiversity.org/accounts/Procyonidae/

Zabarenko, D. (2013, August 15). Introducing the olinguito, the newest mammal discovery. Retrieved December 10, 2013, from http://www.reuters.com/article/2013/08/15/us-usa-mammal-idUSBRE97E0U020130815

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